Plasma Nanotechnology Research Center　　Professor　Kenji Ishikawa

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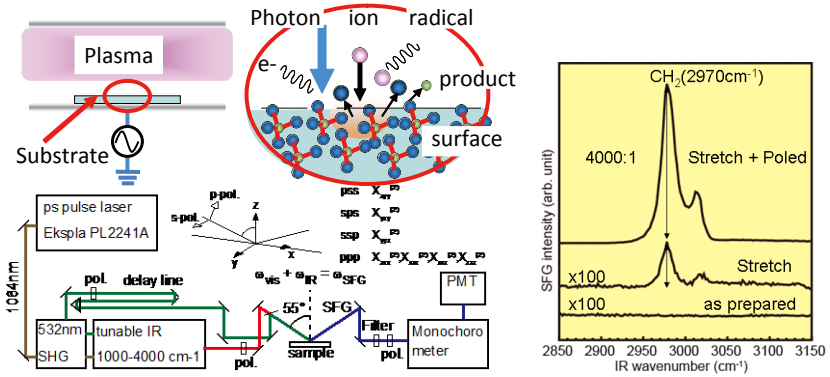
Research subject :

Fabrication of emerging devices at nanometer-level, it needs to precisely control (1) feature-profiles, (2) material-properties, and (3) non-damage. During the processing, we investigate chemical reactions and damage creations, occurred on the bulk and surface, with using atomic-level analysis methods.

Monolayer analysis of chemical species on surface

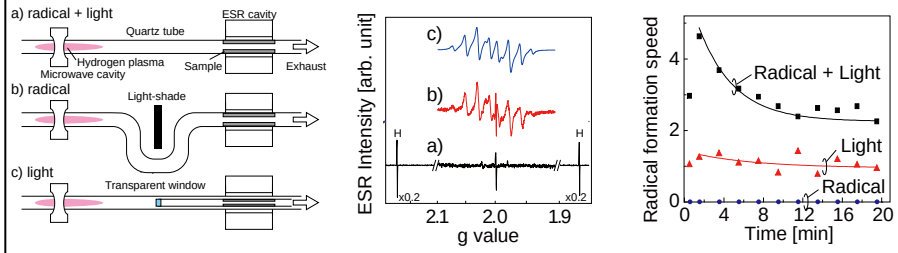


The vibrational Sum-Frequency Generation spectroscopy (SFG) method is applied to analyze atomic arrangement and to understand microscopically of plasma modified surfaces.

Analysis of chemical species at topmost surface

(Vibrational SFG spectroscopy)

Surface reactions during plasma treatments



The real-time in situ electron spin (paramagnetic) resonance (ESR) is developed by us to analyze kinetically radical formation on the surface modification of polytetrafluoroethylene (PTFE) as an example of bio-materials. During irradiation with hydrogen plasma, the gas-phase and surface dangling bonds were measured simultaneously.

Synergistic effect of Plasma emissions and radicals

(Real-time *in situ* Electron Spin Resonance)